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THE AEC REGULATORY PROGRAM—CURRENT STATUS, FUTURE TRENDS

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To assure the safe use of atomic energy in power plants and in other civilian applications, the Atomic Energy Commission has established a program of regulation. This article will briefly discuss the current status and future trends of the regulatory program. Before so doing, there will be a short reference to the commission's philosophy of regulation, and a brief discussion of the status of commercial nuclear power.

The Atomic Energy Commission has believed all along that it is important to transfer portions of AEC's regulatory authority—chiefly relating to the safety of reactor-produced isotopes—to the states, and thus to place this responsibility as close to home as possible. Responsibility for reactors, of course, remains with the AEC. These regulatory agreements provide a working demonstration of how federal authority and responsibility can be effectively transferred to the states. This transfer program is becoming a successful effort, and fourteen states now have signed agreements with the commission to assume some regulatory authority over atomic energy materials. Eight of these are southern states.[1] The South is doing a good job of moving atomic energy from the laboratory to the market place, and also in accepting some of the responsibility for regulating this vital new industry.[2]

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* Commissioner of the United States Atomic Energy Commission. This article is an adaptation of an address given at Oak Ridge, Tennessee at a Nuclear Power Briefing for Utility Executives in January, 1966. The author wishes to acknowledge the assistance of the following AEC staff members in its preparation: Howard K. Shapar, John A. Harris, and John A. Erlewine.

[1] Section 274 of the Atomic Energy Act of 1954, as amended, 73 Stat. 688 (1959), 42 U.S.C. § 2021(b) (1964) provides the basis for transfer of such regulatory responsibilities to the states. The vehicle used for such a transfer is an agreement between the commission and the governor of the state. For a discussion of the background of the AEC-Federal-State Program, see Remarks by James T. Ramey, at the signing of AEC-North Carolina Agreement, July 21, 1964.

[2] Considerable credit for the active role of southern states in atomic energy must be given to the Southern Interstate Nuclear Board which was established under the nation's first interstate compact in the nuclear field.

I. Nuclear Power Growth

It is in the field of electric power generation that atomic energy is finding its greatest application, and one need refer only to recent news accounts to recognize the growing interest in nuclear power in several areas of the United States including the South.

The prospects for nuclear power have improved considerably over the past two years. In fact, just two or three years ago, the near-term outlook was disheartening and some feared nuclear power development might drag.

For example, in speaking at Boca Raton, Florida, at the annual conference of the Southeastern Electric Exchange about three years ago, I paraphrased a remark of Senator Clinton P. Anderson, saying, "There may be nothing so wrong with the nuclear power industry that a few big orders wouldn't cure." I pointed out that AEC had helped place some orders through its power demonstration program, and concluded that it was up to the utility industry to come through with a few more.[3]

It is becoming abundantly clear that the nuclear industry has done just that.

Right now, after ten years of civilian nuclear power, the nation has a total installed capacity of more than one million kilowatts in operation. But that is just the beginning. Today throughout the United States ten other plants are under construction and there have been thirteen applications filed with the AEC to construct sixteen additional units (including the twin units for Florida Power and Light Company, TVA, and Commonwealth Edison Company).[4] These twenty-six plants will have a total ultimate capacity of more than twelve million kilowatts—or twelve times our present installed capacity.

In addition, plans have been announced by the power industry for eighteen additional nuclear power plants having a total ultimate capacity of 14,722,000 kilowatts.

All of these developments reflect a tremendous surge of interest

[3] Remarks by James T. Ramey, Annual Conference of the Southeastern Electric Exchange, Boca Raton, Florida, Mar. 27, 1963. See AEC Release No. 5-10-63.

[4] The fast-moving pace of announcements of plans for constructing nuclear power plants is such as to preclude numbers such as these from remaining accurate for very long. The numbers given here represent the situation as of January 1, 1967.

that is gratifying to those of us who believe very strongly in the advantages of nuclear power. This trend is going to continue, and we are pleased that the South is contributing to this trend.

Now to consider the situation in the South in greater detail.

The Florida Power and Light Company, for example, was the first utility in the nation to file an application for acquiring two large power reactors simultaneously. It was closely followed by TVA which filed its application to construct twin 1,100,000 kilowatt nuclear power plants at Browns Ferry, Alabama. More recently, Carolina Power and Light Company filed its application for a 750,000 kilowatt plant at Hartsville, South Carolina. Then Duke Power Company announced that it had contracted for the construction of twin 822,000 kilowatt plants to be located at Keowee Dam, South Carolina. Virginia Electric and Power Company also announced that it is planning a 750,000 kilowatt plant. Other southern utilities which have talked with the commission staff about nuclear power recently include the Florida Power Corporation and the Tampa Electric Company.

Of course, it is difficult to make specific predictions. However, the AEC staff has compiled some tentative estimates that indicate the South may well have a dozen or more power reactors on the line by the mid-1970's.

So the future looks good. However, these plants cannot be built and operated unless the public is confident that they will be safe. And it is the purpose of the AEC regulatory program to assure such safety.

II. Safety and Public Confidence

The need for safety was recognized from the outset of the nuclear energy program, and safety was built in as the industry developed. Thus, with respect to safety, the nuclear industry has been carefully planned. It hasn't "just growed," like Topsy. In a very real sense, this represents one of the first conscious attempts of government to understand and control the hazards of an emerging large-scale industry. The effort has required a great deal of planning, research and development, training, and careful operations. This point was emphasized in a report back in 1956 by the National Academy of Sciences, which stated:

> The use of atomic energy is perhaps one of the few major technological developments of the past 50 years in which careful con-

> sideration of the relationship of a new technology to the needs and welfare of human beings has kept pace with its development. Almost from the very beginning of the days of the Manhattan Project careful attention has been given to the biological and medical aspects of the subject.[5]

Thus, the development of comprehensive nuclear safety controls before unfortunate accident experience—rather than afterward—is unique. That was a new departure in the philosophy of safety, and it has brought good results.

The fact that no member of the general public has ever been injured by radiation from licensed reactors attests to the basic success of this program. Last fall, Congressman Chet Holifield, Chairman of the JCAE, credited the increased public acceptance of nuclear power to the safety program. He said:

> The inevitability of such success [in achieving public acceptance] is assured not only by the high safety standards so rigorously applied by the AEC to the construction and operation of nuclear reactors, and by the engineered safeguards which the independent Advisory Committee on Reactor Safeguards requires to be built into each reactor, but also by the seriousness with which utility companies view their obligation to guard the safety of the public.[6]

So, this record of safety is a source of pride to everyone involved—the Joint Committee on Atomic Energy, the nuclear industry itself, and the AEC.

But in spite of this excellent record, there is a continuing need to provide for better public understanding of the intensive measures established to assure public health and safety. To maintain public confidence, all of our safety proceedings must be conducted, insofar as possible, in a sort of public "fishbowl." And we need to be ever vigilant in our safety procedures, and press on in improving the development of engineered safeguards for our nuclear reactors.

III. History of AEC's Regulatory Activities

A brief review of the history of the regulatory program will help set the stage for a discussion of the present situation and the future outlook.

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[5] National Academy of Sciences National Research Council Summary Reports, The Biological Effects of Atomic Radiation at iii (1956).

[6] Remarks by Congressman Chet Holifield, Annual Meeting of the Long Island Association of Commerce and Industry, Huntington, Long Island, New York, Oct. 20, 1965.

The regulatory program, while one of the commission's least understood activities, is of paramount importance in adapting nuclear energy to civilian uses. The reason is simple: If our society is to achieve the maximum benefits of the peaceful atom, we must be sure the public health and safety is protected.

A review of the history clearly indicates the AEC has had to learn some of its regulatory lessons the hard way. For example, in 1956, an interesting reactor safety problem involving a certain midwestern atomic power plant was encountered. The AEC's Reactor Safeguards Committee raised serious questions as to the state of technology affecting the safety of the plant, and the commission refused to make the safety report public until questions were asked by the joint committee and certain labor organizations. As a result, Senator Clinton Anderson who was then Joint Committee chairman, asked me to head up a staff study of the AEC's regulatory and safety procedures.[7] That study led to legislation which (a) required that safety reports of the Reactor Safeguards Committee be made public, (b) established the Committee as a statutory committee, and (c) provided for mandatory public hearings.[8]

Unfortunately, the commission "over-reacted" in its interpretation of the new legislative requirements arising from the 1957 joint committee staff study. In assuring itself that procedures for processing reactor construction permit applications would be beyond legal reproach, the commission imposed requirements that did not appear to follow the intent of the joint committee's staff study nor the spirit of the Atomic Energy Act of 1954, namely, to "impose the minimum amount of such regulations and terms of license as will permit the Commission to fulfill its obligations."

The procedures which were established were almost the ultimate in formality, and were aptly criticized at the time as suffering from acute "due-processitis." For example, in addition to the hearings which were required by law for the construction permit and the operating license, hearings were also required for all amendments to applications. Moreover, the hearing itself involved the recitation of

[7] Valuable contributions to this study were made by former AEC Commissioner John Palfrey who was then on the faculty of Columbia Law School, and by Mr. David Toll on the Joint Committee staff.

[8] STAFF OF JOINT COMM. ON ATOMIC ENERGY, 85TH CONG., 1st Sess., A STUDY OF AEC PROCEDURES AND ORGANIZATION IN THE LICENSING OF REACTOR FACILITIES (Joint Comm. Print 1957). See also 71 Stat. 579 (1959), 42 U.S.C. § 2039 (1964).

much superfluous information for the record. It was beginning to look as if the effect, if not the intent, of the mounting red tape was to keep the lawyers and hearing examiners in the saddle.

As early as 1956, in an address to the Chicago Bar Association and the Atomic Industrial Forum, I had warned that, with the licensing system being administered out of Washington, "the issuance of a great amount of paper and very stringent regulations" could be a problem.[9] It was, and still is, my view that it is desirable to develop informal procedures and relationships between the commission and its licensees, consistent with real due process and an adequate record. I thought, and still think, that this theme of informality in getting issues solved—already well recognized in contract law as a means of avoiding rigid and mounting paper work—could also play a valuable role in the field of administrative law.

The need for injecting improvements into the burdensome licensing procedures led to another joint committee staff study which I was privileged to present to the committee in March of 1961.[10] Our report reviewed developments in the regulatory process, again warned against a trend toward over-judicialization and cumbersome procedures and projected a plan for an atomic safety and licensing board within the AEC. Our concerns were well expressed in the following quotation from a report of the Subcommittee on Administrative Practice and Procedure of the Senate Judiciary Committee:

> By now, it has become apparent that the adversary type of proceeding, resembling as it does the processes of the courts, does not lend itself to the proper, efficient, or speedy determination of issues with which the administrative agencies frequently must deal. While the examples of such issues are legion, a few will illustrate the nature of the problem. Questions relating to the establishment of air service, pricing of natural gas products in the field, licensing of atomic reactors, distribution of television and radio channels are matters involving the interests of large segments of the general public as well as the immediate parties. Conse-

[9] Remarks by James T. Ramey, Institute on Impact of Atomic Energy in the Law, Chicago, Sept. 25, 1956.

[10] JOINT COMM. ON ATOMIC ENERGY, 87TH CONG., 1st Sess., IMPROVING THE AEC REGULATORY PROCESS (Joint Comm. Print 1961). Much credit for this study should go to Mr. David Toll and Mr. Jack Newman who were members of the Joint Committee staff at the time, and to Mr. William Mitchell and Professor David F. Cavers who served as consultants to the Committee.

> quently, they might better be solved in some type of proceeding other than an administrative "lawsuit" among numerous parties.[11]

It was as an outgrowth of this joint committee report that the act was amended in 1962 to give the commission authority to establish three-man atomic safety and licensing boards in lieu of single hearing examiners, to limit the mandatory public hearings to the construction-permit stage, and to encourage greater informality in the conduct of the hearings.[12]

One of the first lessons to be learned in a new regulatory program of this nature is that continual changes are inevitable—and are, in fact, desirable—as experience is gained in the use of nuclear systems and in the review process. We are witnessing just this kind of evolution in the AEC's program for licensing power and test reactors.

The procedural changes made in 1962 were acknowledged to be experimental, and after nearly three years of trial a close look at the regulatory program was again needed. In addition, it appeared inevitable that the projected increased growth in nuclear reactor applications should have some impact on the regulatory program, if from sheer volume alone. The reverse could be said to a degree, since the time involved in the licensing process has a very definite impact on the already lengthy planning schedules of utilities.

IV. The Review Panel Study: An Effort at Further Streamlining

Consequently, in 1965 the commission appointed a Regulatory Review Panel to examine the facility licensing program with a view toward streamlining wherever possible. As a result, a panel of eminently qualified industrialists, attorneys, scientists, and other professional people in the atomic energy field was appointed from outside the government.[13] The panel's report to the commission, after an exhaustive six-month study, contained recommendations

[11] S. Rep. No. 480, 87TH Cong., 2d Sess. 6 (1962).

[12] See sections 189 and 191 of the Atomic Energy Act of 1954, as amended, 76 Stat. 409 (1962), 42 U.S.C. §§ 2239, 2241 (1964). See also S. Rep. No. 1677, H.R. No. 1966, 87TH Cong., 2d Sess. (1962).

[13] The Regulatory Review Panel was headed by Mr. William Mitchell, former AEC General Council. Other members were Dr. Manson Benedict, Mr. Roger J. Coe, Dr. Emerson Jones, Dr. C. Rogers McCullough, Mr. James F. Young, and Dr. Walter H. Zinn.

which we believe provide a firm foundation for ways to improve and expedite the regulatory process for nuclear facilities.[14]

Four major problem areas were identified by the Panel: (1) the length of the licensing process, (2) the indefinite nature of the licensing process, (3) the multiplicity of technical safety reviews, and (4) the implications to regulatory manpower requirements that might result from the increase in applications.

A few of the more important recommendations made by the panel and steps that have been taken to implement them will be mentioned. The power reactor licensing procedures prior to these changes will first be described, so that the significance of the new changes can be better understood.

First, there is usually an informal site evaluation whereby the prospective applicant discusses with the regulatory staff the suitability of various reactor sites that he is considering.

The application for a construction permit then is prepared by a utility (usually with the help of the equipment company) and submitted to the AEC regulatory staff. This application, which includes a detailed safety analysis setting forth the technical features of the project, is reviewed by the regulatory staff and by the independent Advisory Committee on Reactor Safeguards.

A mandatory public hearing is then conducted by an atomic safety and licensing board in the vicinity of the project. The board is made up of three members, two of whom are technically qualified and one of whom is experienced in administrative proceedings.

After the hearing, the board renders an initial decision which is subject to review by the commission itself, either on its own initiative or upon petition for review by a party to the proceedings. (One of the recent changes adopted by the commission was to substitute an appeal as of right for the petition for review procedure.)

Essentially the same type of review process occurs before the operating license is issued, except that a public hearing usually is not held.

With regard to the proposals of the Regulatory Review Panel, the commission has either implemented or initiated action on all key recommendations. Some of the suggestions had been anticipated

[14] REGULATORY REVIEW PANEL, REPORT TO THE ATOMIC ENERGY COMMISSION (July 14, 1965). See AEC News Release No. H-17, Jan. 25, 1965, on establishment of the Panel. See also AEC News Release No. H-165, July 21, 1965, concerning submission of the Panel's report to the commission.

and work was started on these in advance of the panel's report to the commission.

V. Role of the Regulatory Staff

The first recommendation of the panel—which it sets forth as the major item around which most of its other recommendations revolve—is that the primary element in the safety review of every reactor project should be the analysis conducted by the AEC regulatory staff.

The panel noted that on the whole, in the relatively few years it has been in existence, the regulatory staff has done a remarkable job in assuring safety. The commission will make every effort to maintain and improve the competence of its regulatory staff to carry out its responsibilities in the licensing process and in the protection of the public in reactor safety matters. Also, as a procedural change in uncontested licensing cases, it has been provided that, in addition to the review and analysis performed by the director of regulation, he prepare and set forth, in a notice of the hearing, his proposed findings which support the granting of the application. He will also be expected to prepare and submit to the atomic safety and licensing board the form of provisional construction permit which he would propose to issue after review by the board.

VI. Role of the Advisory Committee on Reactor Safeguards

A second major recommendation concerned the role of the Advisory Committee on Reactor Safeguards, which is made up of exceptionally qualified men from outside the AEC. Collectively they have competence in all the major disciplines bearing on reactor safety. This committee is required by the Atomic Energy Act to review and report on each major power and test reactor application.

The Review Panel recommended modification of this mandatory requirement. The panel noted that, as the regulatory workload of the commission increases, more of this committee's attention should be directed toward consideration of novel safety problems and new types of reactors, with less attention to routine safety review of conventional reactor types.

Both the commission and the ACRS agree in principle with the intent of this recommendation. Such a change would be sound, and it appears inevitable as the number of projects submitted for licens-

ing increases. It is important, however, that the major function of the ACRS, to provide an independent review of the application and the analysis by the regulatory staff, be strictly preserved. The commission and the ACRS are now attempting to develop a procedure which would carry out the intent of this recommendation, and yet maintain the element of check and balance which the ACRS review provides in the licensing process. Once the commission is assured that a satisfactory procedure can be developed, it plans to consider amending legislation at some future date.

VII. The Role of the Licensing Board

An extensive portion of the Review Panel's study and recommendations concerned the functions, findings, and jurisdiction of the atomic safety and licensing boards, and the conduct of hearings in uncontested cases.

The panel noted a growing tendency in uncontested cases for the hearing boards to interpret their general instruction as requiring a third independent and full technical review in depth of reactor safety issues over and above the comprehensive safety analyses conducted by the ACRS and the regulatory staff.

To implement the several recommendations of the panel regarding the boards, on January 21, 1966, the commission published, for public comment and interim guidance, proposed amendments to its rules of practice, and a proposed "Statement of General Policy: Conduct of Proceedings by Atomic Safety and Licensing Boards."[15] The policy statement not only outlines in detail a redefinition of the functions of the boards but also contains a number of improvements in the conduct of hearings.

In redefining the functions of the boards, the commission has provided that in uncontested cases the boards should neither be required nor expected to duplicate the review already performed by the regulatory staff and the ACRS. The boards would be authorized to rely upon the uncontroverted conclusions of the regulatory staff and the ACRS.

In keeping with this approach, in uncontested cases the board only has to decide two things: (1) whether the application and the

[15] See 31 Fed. Reg. 832 (1966). See also AEC News Release No. J-12, Jan. 20, 1966. With a few revisions, the amendments and statements were adopted effective 30 days after publication in the Federal Register on September 30, 1966. 31 Fed. Reg. 12774 (1966). See also AEC News Release No. J-227, Sept. 29, 1966.

record of the proceedings contain sufficient information, and (2) whether the review of the application by the commission's regulatory staff has been adequate to support the findings proposed by the director of regulation and the form of the provisional construction permit which he proposes to issue.

In other words, the board would not be expected to conduct a *de novo* review of the application, but would test the adequacy of the staff's review upon which the proposed action is based and would determine whether there are any significant gaps in the consideration of safety issues by the applicant, the AEC regulatory staff and the ACRS. If any significant gaps are found and additional information is required, then the AEC staff or applicant should be requested to supply it.

In contested cases the boards would, of course, be called upon to determine the matters in controversy and to make technical judgments of their own on these matters. However, even in contested proceedings, the boards would not be expected to make an independent review of matters not in controversy.

A. *Composition of Boards*

The appointment of an alternate technical member to boards was recommended by the Review Panel to provide experience for new members of the Atomic Safety and Licensing Board Panel, and to facilitate the conduct of hearings when a regular board member cannot be present.

The commission has already begun the practice of appointing a technically qualified alternate to boards. This occurred in five recent cases (*Dresden II, Brookwood, Millstone, Indian Point II* and *Dresden III*),[16] and this practice is formalized in the rule change mentioned earlier and explained in the policy statement. In a related action, the commission has enlarged the membership of the Atomic Safety and Licensing Board Panel to seventeen members—an addi-

[16] In the Matter of Commonwealth Edison Co. (Dresden Reactor No. 3), 2 CCH ATOMIC ENERGY L. REP. ¶ 11, 257 (Oct. 4, 1966); In the Matter of Consol. Edison Co. (Indian Point Generating Unit No. 2), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,238 (June 30, 1961); In the Matter of the Conn. Light & Power Co. (Millstone Nuclear Power Station), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,255 (May 9, 1966); In the Matter of Rochester Gas & Electric Corp. (Brookwood Nuclear Station Unit No. 1), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,254 (April 14, 1966); In the Matter of Commonwealth Edison Co. (Dresden Reactor No. 2), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,252 (Dec. 29, 1965).

tion of three new members—in order to accommodate an increasing number of applications for construction permits.

B. *Procedural Improvements*

The Review Panel also made a number of recommendations to improve public hearings and to expedite the proceedings. The commission, in its policy statement referred to earlier, sets forth a number of other provisions which generally are intended to carry out these recommendations. Thus, the policy statement re-emphasizes the value of pre-hearing conferences to identify significant safety questions or points in controversy, and to settle matters of procedure concerning the conduct of the public hearing itself. In the conduct of the hearing, the boards are urged to exclude, to the maximum extent possible, extraneous or irrelevant issues which are not germane to the proceeding and over which the commission has no jurisdiction.

Another change provides for improved communications in uncontested cases among the commissioners, members of the hearing boards and examiners, and the AEC's regulatory staff. This relaxation of what we refer to as the "*ex parte* rule" should facilitate licensing proceedings.

In addition, a very important part of our "new look" is the emphasis the commission's policy statement places on the hearing as an instrument to inform the public as well as to satisfy the board on public health and safety matters. For example, the policy statement provides that the applicant and the AEC regulatory staff will make an oral statement early in the hearing describing in laymen's language the steps which have been and will be taken to assure public safety. And with respect to the decision itself, the policy statement includes general guidance to the board and specifically requests the following:

> A board's initial decision should be prepared with the objective of familiarizing the public and the Commission with the reasons for the board's conclusions as to the sufficiency of the application and the record of the proceeding, and the adequacy of the review of the application by the Commission's regulatory staff . . . .

The AEC also is providing additional guidance for expediting the decision-making process in uncontested cases. For example, the boards normally will specify some reasonable period of time for the

filing of proposed findings of fact and conclusions of law, briefs, and the proposed form of order or decision. Since these are uncontested cases, it is expected that the proposed findings would be brief, and hoped that the initial decision could come within fifteen days after the board receives the proposed findings. Contested cases, of course, would require more time, but even then it is anticipated that the initial decision ordinarily could be handed down within forty-five days after receipt of the proposed findings.[17]

These revisions are being applied without too much difficulty. Frankly, I had been somewhat disappointed because our previous guidance[18] had not been fully understood or applied. To help alleviate this problem, the commission has established a program to provide for conferences with small groups of board members and AEC staff to discuss the meaning and intent of the panel report and the procedural changes. The initial discussions under this program have been encouraging. In addition, the decisions in the five recent cases mentioned above indicate that the commission's philosophy and approach are being better understood.

The strictly procedural aspects of these cases are notable in several respects:

First, an effective prehearing conference was held well in advance of the main hearing. This meeting, as was intended, served to better define the scope and number of subjects to be considered at the evidentiary hearing.

Second, the staff organized the written safety evaluation in line with the proposed design criteria for construction permits which were issued in November of 1965.[19] The board indicated in its opinion in the *Dresden II* case[20] that this systematic approach to

[17] Recently there were two demonstrations of the fact that AEC regulatory processes can, in fact, be handled with dispatch. The construction permit for Dresden III was approved six days after completion of the hearing, and a construction permit was issued to Rochester Gas & Electric Corporation only eight days after completion of the hearing. In the Matter of Commonwealth Edison Co. (Dresden Reactor No. 3), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,257 (Oct. 4, 1966); In the Matter of Rochester Gas & Electric Corp. (Brookwood Nuclear Station Unit No. 1), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,254 (April 14, 1966).

[18] Rules for the Conduct of Proceedings by Atomic Safety and Licensing Boards as published 27 Fed. Reg. 12184 (1962). See also AEC News Release No. F-240, Nov. 25, 1963.

[19] See AEC News Release No. H-252, Nov. 22, 1965.

[20] In the Matter of Commonwealth Edison Co. (Dresden Reactor No. 2), 2 CCH ATOMIC ENERGY L. REP. ¶ 11,252 (Dec. 29, 1965).

presenting a technical analysis of a proposed reactor facility was a contribution to the licensing review process.

Third, the applicant and the staff concentrated their technical effort and presentation at the hearing on the novel safety features of the proposed facility. In turn, the board, in the descriptive findings in its decision, concentrated on new or different safety-related features of the proposed facility which had not been considered and approved in previous cases.

Fourth, the boards' decisions discuss, in a concise manner, the principal safety matters presented by the proposed construction of the plant, with emphasis on their novel features. The boards also give general reasoning for reaching their decisions.

All of these actions were steps toward improving the hearing process while at the same time maintaining the basic purposes of the hearing. Certainly these actions were significant in enabling the boards to issue their decisions in less than half the average time for previous construction-permit cases. In the past such cases have required about fifty days.

VIII. Criteria, Standards, and Codes

The Regulatory Review Panel noted as one of its main conclusions the need for criteria, standards, and codes for nuclear facilities. The development of such criteria in the construction permit stage was viewed by the Review Panel as a vehicle by which "the licensing process could be simplified, shortened, and made more exact and predictable. . . ." That is a worthwhile goal.

The commission already had directed a stepped-up program to develop criteria for nuclear facilities, but not as much has been done on the development of standards and codes. However, as a result of the Review Panel's work, the regulatory staff began working in earnest with industry groups and professional societies on the problem of standards and codes, technical specifications for operating licenses and procedural methods for accomplishing these.

In moving ahead on criteria, the commission issued for comment last November proposed nuclear power plant design criteria for construction permits. In the interim they are intended to provide guidance to the nuclear industry, the utilities, and to the several regulatory review groups.

The ultimate goal is the evolution of industry codes based on accumulated knowledge and experience, as has occurred in various

fields of engineering and construction. In view of the continuing evolution in the design of different types of reactors and their components, this obviously will be a lengthy and difficult task involving professional societies, the nuclear industry and the AEC.

IX. Reactor Safety Research

The Review Panel stressed the importance of nuclear safety research in resolving the major safety problems of reactors, in determining the extent to which engineered safeguards may be relied upon to prevent serious consequences of reactor accidents, and in developing reactor safety standards and criteria.

In the summer of 1965 the commission established a Steering Committee on Reactor Safety Research to coordinate its already extensive program in this field and to insure that the needs of the Director or Regulation are met. In addition, the commission directed that a substantially augmented research and development effort be undertaken. This steering committee—composed of key people on the staffs of the general manager and the director of regulation—is actively engaged in planning such a research program which will emphasize the development of improvements in reactor plant design and capability of critical systems and engineered safeguards. This work will be carried out in cooperation with industry.

In announcing this augmented program before the JCAE in the summer of 1965 during the Price-Anderson hearings, I explained the need for this effort with the following words: "This research and development work, together with increased emphasis on the development of more specific reactor standards, will be necessary as reactors increase in size and are built close to metropolitan load centers."

X. Looking Ahead at the Regulatory Program

Now what about the future of the regulatory program? I think we can look to progressive improvements in the regulatory process, based on technological progress and procedural changes.

As we try to look forward over the next ten to fifteen years, we can see that the commission's regulatory role will have to grow to keep pace with these developments:

(1) A major increase in the number of large power reactors placed on the line.

(2) A large increase in the average power rating of nuclear plants.
(3) The further development of advanced converter and breeder reactors.
(4) A greater use of plutonium fuels.
(5) A nuclear desalting program which will require large dual-purpose plants producing both electric power and fresh water.
(6) New and imaginative approaches to reactor siting—for example, the use of offshore, man-made islands—as atomic plants move closer to metropolitan centers.

All of these will pose new regulatory challenges. And it is my belief that these challenges will contribute to continuing progress in the licensing process. We will see great improvement, I believe, with respect to regulatory procedures for water-cooled reactors as they become increasingly standardized.

Also, increasing technological advances in engineered safeguards will contribute greatly to resolving the siting problem, and other safety problems that may arise as nuclear applications evolve.

There is one additional change of a procedural nature that I have been advocating for some time. It would be useful to establish a permanent chairman and vice-chairman for the licensing boards, and to set up a small permanent staff. Such a chairman and vice-chairman could help bring greater consistency to the board system, and could act as liaison between the committee and the other board members. A somewhat similar system has proved workable in our handling of contract appeals, and it seems to deserve serious consideration in the reactor licensing area. On January 20, 1967 the commission's rules were amended to provide for a permanent chairman and vice-chairman who are expected to take office in April 1967.[21]

In the next five to ten years, as we gain experience and confidence, and the volume of applications increases, I would expect that the mandatory hearing process might be eliminated, and the licensing board system might evolve into a more permanent full-time board with the commission delegating to the board its final adjudicatory authority. The commission would retain its rule making power.

[21] See 31 F.R. 16309, Dec. 21, 1966; AEC News Release No. J-278, Dec. 9, 1966.

Finally sometime thereafter as further experience is gained, it might be desirable to establish the commission's regulatory organization as a wholly separate agency, possibly combining with it some of the functions of the Federal Radiation Council and of the Department of Health, Education and Welfare.

David F. Cavers, Fessenden Professor of Law, Harvard Law School, who has conducted extensive studies of the regulatory role of the commission, has endorsed some of the above suggestions and in addition has charted alternative courses for the commission to follow.[22]

XI. Conclusion

I hope this discussion provides a better understanding of the commission's regulatory program—where it now stands and how we hope to improve it. The commission is trying to develop better procedures, and we are taking advantage of every technological advancement to make the regulatory process a simpler matter for the businessman. At the same time, we should emphasize—and we know industry is in agreement with this—that the AEC will never take shortcuts in matters of safety. We want to maintain that record of unparalleled conservatism on safety precautions for nuclear plants.

We will continue to do our best to carry out the congressional mandate to provide "a program to encourage widespread participation in the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public."

[22] See Cavers, *Administrative Decisionmaking in Nuclear Facilities Licensing*, 110 U. Pa. L. Rev. 330 (1962). See also Lecture 2 by David F. Cavers, West Virginia College of Law, Dec. 23, 1965, in The Donley Lectures.